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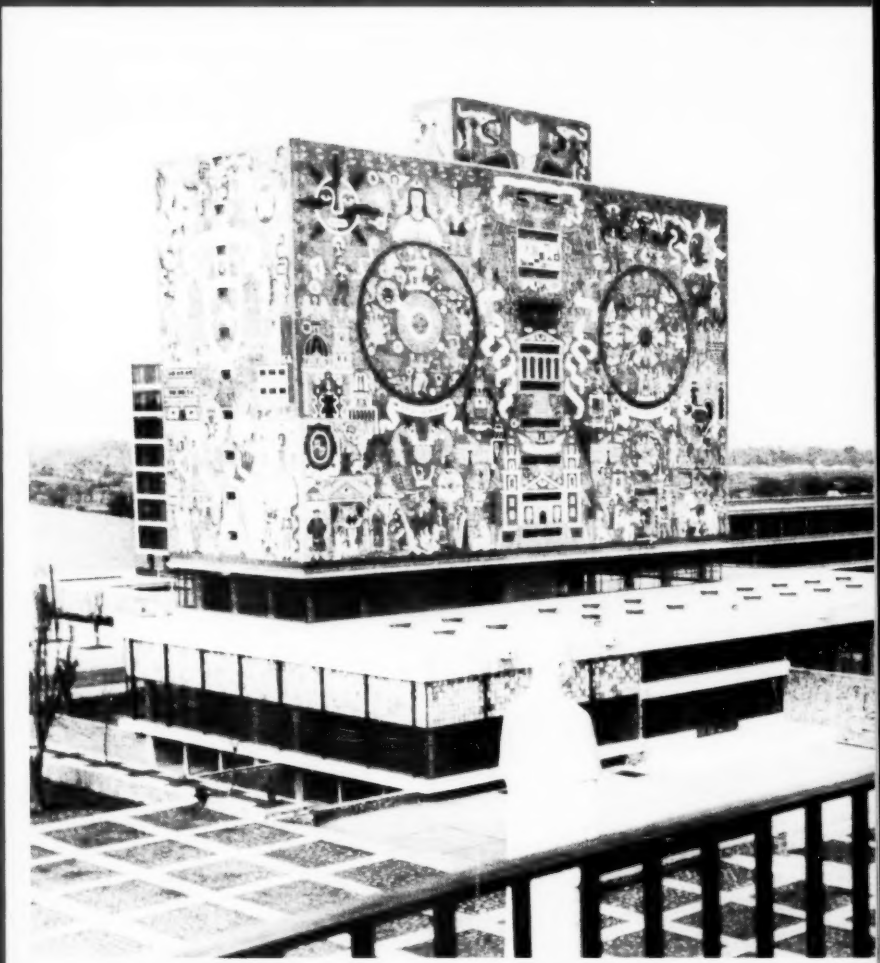

September 1956

Volume 1, No. 3

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Vol. 1, No. 3 September 1956

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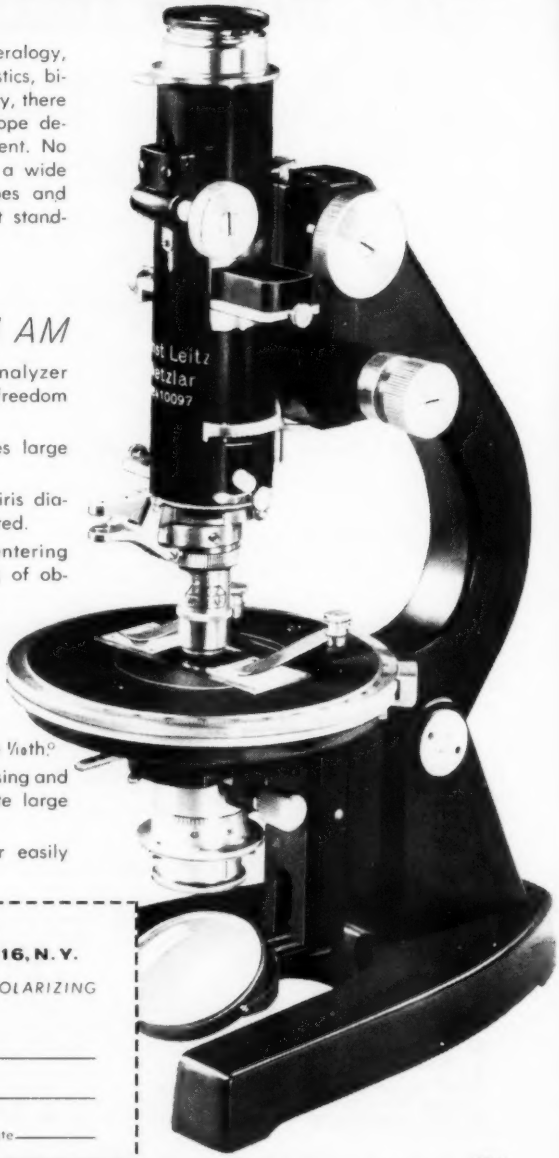

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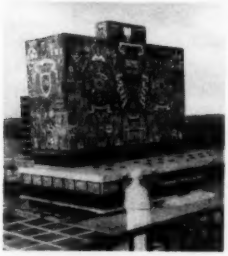
On Education

"Education is the foundation of a people's prosperity, and at the same time the surest means of preventing abuses of power." These are the words of President of Mexico, Benito Juarez in a declaration to the Nation on July 7, 1859. It is appropriate that geologists of the world, gathered in Mexico for the XXth International Geological Congress, pause to reflect on the words of former President Juarez. Education is with us from the cradle to the grave, in all corners of the globe and in all stages of civilization. It means many things to many people.

"Education is the foundation of a people's prosperity . . ." Steeped in the heritage of the remarkable Mayan and Aztec civilizations, Mexico has a background of culture and an appreciation of education. The University of Mexico, founded in 1515, was the New World's first institution of higher learning. As a tribute to this proud university and symbolizing the vitality of modern Mexico, the striking new campus of the University, la Cuidad Universitaria, has taken form where in 1950 there was only lava.

"Education is . . . the surest means of preventing abuses of power." Modern communication has thrown the more primitive cultures of our world into continual contact with those most advanced and has been a large factor in the emancipation of large areas of the world which now face serious adjustments to their new-found freedom. Great problems of education lie before us if we are to consolidate our advances in civilization for an era of peaceful existence. Geologists of the world have a stake in these problems for, although geology knows no political boundaries, it profoundly influences the course of world politics. It is important, therefore, that the voice of the geoscientist be heard in the councils on education of every country of the world as we strive for peaceful co-existence.



OUR COVER

Library, National University of Mexico, University City. Mexican mural artists have created a most unusual facade in natural stone mosaics. *Photo by courtesy of the Mexican Embassy.*

The AMERICAN GEOLOGICAL INSTITUTE is a non-profit professional service organization established and managed by the scientific societies in the fields of geology and geophysics in cooperation with the National Academy of Sciences-National Research Council. It is the instrument of the profession serving and advancing the welfare of the geoscientist in matters relating to education, professional responsibilities and government relations. It is an active member of the Scientific Manpower Commission. It also functions in the stimulation of public education and awareness of the earth sciences, through career literature, the scouting program and other channels of communication.

GEOTIMES is the news magazine of the geological sciences. It reports on current events in the earth sciences, public education and public relations efforts throughout the profession, as well as appropriate legislative and governmental issues. It announces scholarships, fellowships, publications and new developments. It provides a forum for discussion of timely professional problems, and affords a common bond between the many specialized groups within the earth sciences.

International Responsibilities of Geologists

by

Walter H. Bucher [1]

The professional geologist is, in general, a wage earner first and a contributor to science second, whether he makes his living by serving an industry, a state or government survey, or in the academic field. His immediate work ties him to a given region or regions which may be as small as a mining camp, a groundwater district, or a county, or as large as a state or even a nation. But, whether small or large, specific regions are uppermost in his thinking. Accordingly, in every country, most of the geological literature concerns local areas and is written primarily for home consumption; yet much of it contains observations and conclusions which are of wider interest, buried in official publications with titles that suggest nothing but areal description. A simple way to "pull out" such material of wider interest from its local context is to list such items separately in the bibliographies. The Geological Society of America is at present urging its contributors to provide all possible headings under which important matters covered in their papers may be placed in bibliographies. Such a method should be widely adopted.

Being regionally conditioned we find it difficult to think of our publications as part of world literature. Yet, the thought of foreign readers should always be present in the publication of regional reports. Titles, e.g., should indicate the location of the area described as accurately as possible. The first text illustration might well show its position with reference to geographical coordinates and political boundaries, according to a pattern long prevalent in the United States.

Large scale maps, such as accompany most regional reports, should not be treated solely as illustrations accompanying the text, but as basic docments directly usable without that text by geologists not familiar with the region or country to which it refers. The legend should give as much specific information as possible in terms internationally understood. It should, e.g., not be necessary to turn to the text to find out the nature of faults shown or the magnitude of dips in folds. The scale should always be given as the representative fraction which is independent of local measures. "One inch to 2.5 miles" on an American map is as annoying to a Russian as "one centimeter to 2.5 versts" is to the American.

For the comprehension of broader relations, the contents of the basic large-scale maps must be generalized and combined with many others in summary maps of smaller scale. Professional geologists are apt to underestimate the value of such maps. The habit of looking up from the pressing detail of an ore body or an oil pool and seeing it in its regional setting is by no means general among the "practical" men of our profession; its monetary value has only lately been generally realized in the petroleum industry and is still outside the vision of many mining men.

As scientists, we recognize, of course,

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[1] *Dr. Walter H. Bucher, Professor of Geology, Columbia University, New York is the immediate past-president of the Geological Society of America and is a Director of the American Geological Institute. Dr. Bucher, well-known in international circles, was awarded the Leopold von Buch medal in 1955.*

the fundamental importance of small-scale summary maps which provide the perspective of the realities of regional geology which is needed for the development and perfection of valid fundamental theories. To provide them, by the highest standards, is therefore a basic international responsibility.

Map costs are high. It is not surprising, therefore, that even the publication of such important maps as the series of state maps issued for the most part in cooperation with the United States Geological Survey requires much stimulation and cooperative efforts of many. It took the impact of an impending International Geological Congress to make possible the first authoritative geological map of the United States (1933). But this is not all. As regional knowledge grows more precise, these maps must be revised. We should be as concerned about keeping our regional summary maps up to date as we are in our production statistics. This is as truly our responsibility as producing the maps in the first place.

Cooperation Needed

The geologists of all countries share the one great duty to take part in the incessant effort of testing all geological theories and methods against their local experience and, when necessary, make discrepancies known. Nowhere is the need for such determined cooperation greater than in the efforts to increase the precision of the relative geological time scale based on the fossil record. Professional geologists working in the petroleum industry are apt to lose sight of the importance of fossils, for within the confines of one oil field and even one sedimentary basin, bed tracing by lithologic characters and by electric logging makes fossils appear superfluous. But the men who struggle to unravel the structural complexities of orogenic belts or attempt to relate geologic events across the seas know better. No radioactive method comparable to the C_{14} method for the last 30,000 years is in sight for earlier geologic time. As to present methods, the field geologist knows that he could never wait for the vast number of radioactive determinations he would need for his work even if they provided the same precision as fossils (which they do not) or if he could afford them (which he cannot). Only the fossil record can provide the answer, but it must be read by competent specialists. Here we face an embarrassing fact — while professional geologists everywhere depend on the judgment of paleontologists in the most fundamental aspect of their work, there are far too few of them in the world. If we want geology to be worthy of being called a science, it is our responsibility to bend all efforts to increase the number of competent men who devote full time to the critical study of those groups of fossils which are crucial to the precision of the geologic time scale. The men will be found when we accord them the scientific recognition and the salaries they deserve, and they will maintain top standards if we demand them.

The professional geologist carries, of course, responsibilities other than those of the scientist, especially those in the economic-political field connected with the search for and the extraction of mineral resources. Much geological information must temporarily be kept secret in the interest of the competitive system of which we are proud as the source of our prosperity and resultant personal freedom. But as conditions change, much of this information could and should be made available. The co-

continued on page 23

GEOTIMES *goes to Mexico*

On the occasion of the XXth International Geological Congress, GEOTIMES is flying to Mexico. This, the September issue, is devoted largely to the Congress and to the geology and archeology of Mexico. We are most appreciative to Dr. Jenaro Gonzalez-Reyna, Congress Secretary, for his efforts in asembling the Mexican contributions and similarily to Carl Freis, U. S. G. S., for his assistance. The Embassy of Mexico and the Pan American Union have been particularly helpful to the GEOTIMES staff.

Copies of this special XXth International Geological Congress issue of GEOTIMES are being flown to Mexico City by AMERICAN AIRLINES for distribution to all Congress participants from the AGI exhibit at the Congress. We are indebted to AMERICAN for their help in expediting delivery. We are appreciative also of the special efforts of our Printer, Williams & Heintz Lithograph Corporation.

We regret that Spanish accents were not available in our regular type face.

OUR HOSTS IN MEXICO

The task of preparing for the XXth Session of the International Geological Congress has fallen to a small corps of Mexican geologists and collaborators, which is understandable in view of the limited number of geologists in Mexico. The task has therefore been more difficult than it would have been in many other parts of the world where larger numbers of geologists are available for such an effort. To add to the difficulties, the major part of the financial backing for the enterprise was not received until much later than expected; the Committee also suffered the loss of two of the key personnel.

Petroleos Mexicanos has been a powerful force in preparing for the Congress, and personnel of the Institute of Geology of the National University have contributed substantially. Other organizations, both official and private, have also served effectively, some at considerable sacrifice. These many geologists and collaborators deserve congratulations and thanks for making the XXth Session of the Congress possible. A few of those who have carried the major responsibility for planning, coordinating, and arranging for this event are presented below, with a brief description of their tasks. It will be noted that almost all of them have had concurrent responsibilities to fulfill.

ING. ANTONIO GARCIA-ROJAS, President of the Executive Committee of the Congress, has had the major responsibility for planning the over-all nature and scope of the Congress. This has required making decisions on the grouping and number of technical programs, sites for the meetings, the field excursions to be offered, selection of monographs to be printed, fees and quotas, official receptions, organization of committees for registration, lodging, excursions, publications, technical sessions, public relations, etc. Ing. Garcia-Rojas is Manager of Exploration of Petroleos Mexicanos, a position which in itself keeps him fully occupied. Tony directs the exploration program of the company from initial geologic studies to final drilling.

ING. EDUARDO J. GUZMAN, General Secretary of the Executive Committee, was among those who initiated the idea of holding the 20th session in Mexico and helped to obtain the official invitation. He has shared with Ing. Garcia-Rojas and others the task of organizing the Congress, and all aspects of the preparations have passed through Eddie's hands for his opinion and stimulus. In addition to complex organizational matters, he played a major role in the preparation of the circulars and overseeing technical and personnel matters relating to field excursions. He is in charge of the Symposium on Petroleum and Gas, and he supported the holding of the Symposium on the Cambrian. His contribution to the compilation of the Geologic Map of Mexico, first distributed at this Congress, has been the determining factor in producing this map. Ing. Guzman is Assistant Manager of Exploration of Petroleos Mexicanos, a position with heavy responsibilities requiring much of his time.

DR. JENARO GONZALEZ-REYNA, General Secretary of the Executive Committee, participated in extending the invitation to the 19th Session in Algiers to hold the 20th Congress in Mexico. Shortly after returning from Algiers, Dr. Gonzalez-Reyna began in his spare time to compile the World Directory of Geologists; as preparations for the Congress accelerated, he became a General Secretary with Ing. Guzman and thereafter devoted most of his time to Congress matters. Besides conferring with and advising other members of the Executive Committee, corresponding with all parts of the world, and planning excursions, he has organized the Symposium on Manganese and supervised the publication of monographs, papers for the several symposia, and other reports and circulars. Apart from Congress duties, Dr. Gonzalez carries responsibilites as Technical Assistant to the Exploration Department of Petroleos Mexicanos and as Chief of the Section of Mineral Deposits of the Institute of Geology of the National University.

DR. MANUEL MALDONADO - KOERDELL, Editor of Excursion Guidebooks, undertook the compilation, editing, and publication of the guidebooks, a chore made especially difficult by the fact that funds were made available only at a very late date. District descriptions had to be tied together with general descriptions of intervening areas, the styles and formats of many authors reconciled, and in some cases, the Spanish translation had to be provided. Not all the material for the guidebooks had been transmitted to the Congress even as late as a month before the opening date. Dr. Maldonado has had a staff of only 16 people to help with this tremendous burden of editing, translating, drafting, typing, and proof-reading. Besides Congress work, Dr. Maldonado has spent at least half his time at the Panamerican Institute of Geography and History of the Organization of American States, fulfilling his duties as Secretary of the Panamerican Committee for the Geophysical Year, in which Mexico will play an active part, and as Secretary of the Committee on Physical Oceanography. He is also in charge of the Institute's geological program in Central America.

ING. SANTOS FIGUEROA, Director of Technical Sessions, has had the problem of arranging for the rooms and all the equipment to be used for the technical sessions, the readying of the exhibit hall, and assigning exhibit space at the University city. The manganese and petroleum symposia have been organized by Dr. Gonzalez and Ing. Guzman but all the rest of the programming for the technical sessions and naming of co-chairmen has been the responsibility of Ing. Figueroa. He has worked also with Lic. Heredia in arranging for transportation between downtown Mexico and the University City. Besides his Congress work, Ing. Figueroa discharges the duties of Chief of the Geophysical Department of Petroleos Mexicanos.

LIC. JORGE HEREDIA-FERRAEZ, Director of Public Relations, has attended to all arrangements for varied services to Congress attendants, such as exchange aid, restaurant service, general information, transportation, etc., and for social functions during the sessions of the Congress. This has meant searching out and securing the use of suitable buildings for special events. He has also been in charge of arranging for press contacts and news reporting before and during the sessions. Besides these Congress duties, Lic. Heredia has continued with his duties in the Legal Department of Petroleos Mexicanos, although his time was increasingly devoted to the Congress as the opening date approached.

ING. GUILLERMO P. SALAS, Coordinator of Excursions, solicited the cooperation of geologists, official organizations, and private companies, and obtained invitations to visit individual mining districts and research areas, and the cooperation of all in preparing and transmitting guidebook materials, and designating personnel to guide the excursions. Bill Salas was largely responsible for programming the excursions so that serious conflicts did not arise and for naming directors and guides, and coordinating the work done by the various guides on the different excursions. As Director of the Institute of Geology of the National University, he has contributed also by assigning all personnel and resources of the Institute to attend to Congress needs. Ing. Salas has a private consulting practice in oil geology in Mexico and Cuba, together with the direction of the Institute of Geology, and hence the

continued on page 10

GEOLOGY in the Public Eye

The Traveling High School Science Library program went into operation in October 1955, sponsored by the AAAS with support from the NSF. Sets of 150 books on science are distributed on loan for periods of 4 to 5 weeks to selected smaller high schools located in communities with poor library facilities. Sixty-six schools were chosen for first distribution.

The books are not texts but are more or less popularized works. Biography is strongly represented. A number deal with the history of science and with science in general; and their are a few titles for each of such subjects as aviation, exploration, and conservation. Leaving all these to one side, there follows a condensed tabulation of the major science fields and the number of volumes representing each. (There is some duplication, as several books cover more than one field.)

Biological sciences	40
Medical sciences	29
Physics and mathematics	23
Engineering	15
Astronomy, meteorology, etc.	15
Chemistry	13
Geology, mineralogy, paleontology	7

As usual, geology comes in on the caboose. There are only four fully geological books in the whole library: Croneis and Krumbein's *Down to Earth*, the Fentons' *Giants of Geology*, Simpson's *Life of the Past*, and Kraus and Slawson's *Gems and Gem Materials*. Max Ball's *This Fascinating Oil Business*, Robinson's *Life of Louis Agassiz*, and Darwin's *Voyage of the Beagle* are on more or less allied subjects.

This meager assortment gives one pause. Where, it might be asked, is Colbert's *The Dinosaur Book*? Where is Darrah's *Powell of the Colorado*, Landes and Hussey's *Geology and Man*, Stamp's *The Earth's Crust*, Stegner's *Beyond the Hundreth Meridan*? How about Cloos' *Conversation with the Earth*, or Libby's *Radiocarbon Dating*?

The AAAS announcement states that the books were selected "with the aid of scientists, science teachers, and librarians," and that organizations requested to evaluate books on geology were the AGI, the GSA, and the AGT.

No comment.

Hosts *continued from page 9*

effort devoted to the Congress has meant considerable personal sacrifice.

MRS. MARGARITA EZCURDIA VDA. DE NORIEGA, Chief of the Administrative Department, has been one of the principal figures in that all administrative details relating to the Congress have passed through her hands. International correspondence has been routed or answered directly; clerical personnel has been assembled and supervised; Congress registration has been managed and problems resolved, many times without the benefit of consultation with other members of the staff. Accounts, bills, and other fiscal matters have been handled first by her before passing on for final settlement. In fact, Mrs. Noriega has generally been the first point of contact for all persons, materials, and correspondence that have come into Congress headquarters. The task has been a full-time one and difficult, and congratulations are well merited.

ING. FEDERICO MINA-UHINK, Treasurer, has been active throughout most of the planning for the Congress and has helped and given counsel to many of the other members of the staff. He has carried great responsibility in discharging fiscal obligations and seeing that Congress funds were utilized to best advantage. One of his extra duties has been to prepare and be Director of a field excursion to Baja California, which has required time-consuming trips away from Mexico City. Ing. Mina has been kept, in addition, fully occupied as Chief Geologist of Petroleos Mexicanos. Congress duties have been an added burden which he has accepted with enthusiasm.

Scientific Information Conference Planned

An International Conference on Scientific Information is to be held in Washington, D. C. in the spring of 1958 under the sponsorship of the National Academy of Sciences, the National Science Foundation and the American Documentation Institute. The conference will be concerned with the solution to the acute problem of organizing and disseminating the rapidly increasing results of scientific research which are overtaxing existing facilities. Further information on the conference may be obtained from the INTERNATIONAL CONFERENCE ON SCIENTIFIC INFORMATION, NAS-NRC, 2101 Constitution Ave., N. W., Washington, D. C.

A glimpse of

PRE-SPANISH MEXICO

by

Aurora Anaya

The most important archeological area of Mexico lies between the Tropic of Cancer and the Guatemalan border. The evolution of the pre-Spanish cultures which developed here shows five definite periods, each subdivided into various stages which have special features.

I. PREHISTORIC PERIOD. The people of this epoch were nomadic hunters who lived, for the most part, in the dens of such Pleistocene animals as the mammoth, horse, bison, etc. An example of this period is found in Tepexpan where remains of mammoths, fossil man and stone artifacts are found under a capping of caliche, dated geologically at 8000 B.C.

II. PRECLASSIC PERIOD. During the three stages of this period which extended from 2000 B.C. to 200 B.C. there was a considerable advance in the establishment of permanent homes, in the knowledge of agriculture, ceramics and textiles, in the building of ceremonial structures and the appearance of fire gods.

Remains of this cultural level are found at El Pedregal, D. F. Under lava at Copilco, graves have been discovered containing gifts to the gods, and at Cuicuilca, partly buried by lava, is the oldest known building in the Valley of Mexico. The conical monument is unimportant from an architectural point of view, but indicates a very important cultural development. Altars and offerings to the fire gods have been found associated with this structure.

In Tlapacoya, Mexico state, a pyramid of upper pre-Classic period, found in 1955, has blocks of stone and mud set *en echelon* and contains tombs with painted ceramics on the walls, intaglios, fragments of textiles, bottoms of baskets, all of which show a period of transition to that of the Teotihuacan. This discovery has been of great value to Mexican archeology. The lowest stages of the Pyramid of the Sun at Teotihuacan and the Temple of the Dancers of Olmec style at Monte Alban also belong to the pre-Classic period. The megalithic architecture and the huge stones sculptured with human figures in bas-relief at Monte Alban are very characteristic features of this period.

III. CLASSIC PERIOD. During this era, 2000 B.C. to 800 A.D., came the maximum development of ceremonial centers, urbanism, writing, and the calendar. The organization was theocratic, and its principal deities were Huehueteotl, god of fire, Tlaloc, god of rain, and the Plumed Serpent. Platforms and steps of stone and wood were widely employed in ceremonial architecture. Funeral ceramics were highly developed, principally at Monte Alban where some beautiful urns have been found.

The first great culture of this period was that of Teotihuacan, the ceremonial center of which occupied an area of more than 6 km. square northeast of Mexico City. The "Street of the Dead" formed the axis of the grid of a great city laid out geometrically and mathematically. The related buildings are at the right and left of this avenue. In "La Ciudade" the Temple of Quetzalcoatl is of particular interest. It is constructed of andesite and cut limestone blocks, representing enormous heads of the plumed serpent, an ornamental motif very well established in the culture of ancient Mexico. Teotihuacan is also noted for its colossal sculpture and mural painting.

The culture of Monte Alban was contemporaneous with that of Teotihuacan. The ball court and the numerous tombs at Monte Alban are of outstanding importance. The most beautiful tomb is No. 104, with its painted walls, and the most famous one is No. 7, discovered in 1932 where a treasure of Mixtec jewels, now on exhibit in the local museum of Oaxaca, was found The Mixtec people were distinguished by their excellent work in copper, gold and silver.

Mitla, Oaxaca, another pre-Spanish city of great religious importance, certainly was of later development than the culture of Monte Alban. At Mitla, the buildings

are adorned with elaborate fretwork, and the openings have monolithic lintels. The underground cruciform tombs are also decorated with fretwork, much superior to that found at Monte Alban.

Xochicalco, in the state of Morelos, was a sacred city as well as a fortress, and its form is that of a typical pyramid. The principal building was a platform with relief carvings representing the plumed serpent.

The archeological site of La Venta lies between the Papaloapan River and the swamps of Tabasco. Characteristic of the Olmec people is the simple, realistic art seen in the jade carvings, the enormous heads sculptured in basalt, and the unique worship of a feline goddess.

The beautiful Mayan culture was developed in the states of Tabasco, Chiapas, Campeche, Yucatan and Quintana Roo. The Mayan architecture was the most advanced of pre-Colombian Mexico. The principal structures were built around plazas and generally there was a central pyramid on a natural hill. Other monuments are stelas and monolithic altars.

Palenque, in the valley of Usumacinta, is noted for its palaces with bas-relief in plaster, the decorative cornices of the temples, and the tower of four floors with windows and interior stairs. The funeral chamber and sculptured sarcophagus in the Temple of the Inscriptions are of unusual artistic value. Yaxchilan has remains of buildings, beautiful sculptured stelae and altars. Bonampak is unique because of its painted murals which have an extraordinary richness of colors. The Island of Jaina near Campeche was a Mayan cemetery in which innumerable figurines of great esthetic value and fine ceramic work have been found.

In Veracruz, the axes, palms and yokes sculptured in stone and of unknown use are noteworthy. Associated with the yokes are the smiling caricatures of the Totonac people who are thus thought related to a culture of happiness in contrast to the austerity in the plateau country culture. El Tajin, near Papantla, should be considered as a subdivision of the Teotihuacan culture because it represents a continuation of it. In the principal pyramid, the niches represent nothing more than the development of the form and serve only to give the monument a chiaroscuro effect.

IV. Post Classical Period. This period started in the Central part of Mexico with the maximum development of Toltec culture and continued from 800 to 1250 A.D. Militarism began and the invasion of barbarous tribes from the north brought in new elements such as the bow and arrow. Among the new gods were Quetzalcoatl, god of the wind, and Cinteotl, god of the corn, among many others. The two cities which are most characteristic of the Post Classic Period are Tula in Hidalgo and Chichen Itza, Yucatan. Tula is known as the region of the Chichemecs, the barbarians who became civilized. Chichen Itza showed the intimate contact with the new elements by its decorative types.

At Tula there was a rigidity and austerity shown by structural elements in cubes and cylinders, columns of the plumed serpent, sculptured pillars with bas-relief, friezes with polychrome designs, flat floors and ball courts with plain walls and rings of stone, athletic figures as posts for altars, caryatids, and the chac-mool; all of these are very characteristic of the sculpture of this period. The Toltec culture had a variation at Cholula, the central ceremonial city of the Valley of Puebla. There, the pyramid is of fabulous proportions and is dedicated to Quetzalcoatl, the guardian god of Tula. The ceramics with polychrome laquer at Chulula are famous.

Chichen Itza was the sacred city of the New Empire period of the Mayans and was founded at the beginning of the sixth century. In its architecture two distinct styles are to be observed: the Mayan period and the Mayan-Mexican in which decorative elements from Tula appeared. Uxmal, founded by the Xiues in the tenth century, is one of the most beautiful pre-Spanish buildings and is noted for its mosaics of stone which were never equaled in the Mayan territory. The House of the Governor is the outstanding building in the pre-Colombian period.

V. Militaristic Period. In this epoch the theocratic-military organization developed. Religion was converted to politics and new gods appeared including Huitchilopochtli, guardian god of the Aztecs, Coatlicue, Tezcatlipoca, Ometochtli, Xipe Totec and many others. Of the cultures which predominated in this period, the Aztec is distinguished by its skillfully executed monumental sculpture of vigorous plastic force whis is yet very individualistic and strong. Among the Aztecs were true artists who worked in rock crystal and obsidian and made mosaics of turquoise and of feathers. The codices (written parchments) which they painted

continued on page 19

Geological Institute of Mexico

by

J. Martinez Portillo

Many contributions to the early knowledge of the geology and mineralogy of Mexico were made by the Spanish savants sent by the Kings of Spain to the New World during the 16th to 18th centuries and subsequently by Mexican National and foreign investigators. A small group of Mexican scientists recognized the necessity for establishing an organization for the systematic classification and recording of these early data, and for conducting investigations of the geology and mineralogy of Mexico. The group was stimulated by the success of the government geological survey which had been organized sucessfully in England in 1835. In many respects like the British survey, the Geological Institute of Mexico was established in 1888, a pattern later to be followed by the United States and countries on the continent of Europe.

The history of the Geological Institute of Mexico falls into three stages chronologically.

The first, or founding, stage began on May 26, 1886 when the persistent efforts of the Mexican scientists succeeded in obtaining approval from the National Congress, through the Minister of Production, for the formation of the Geological Institute of Mexico. The Institute was directed to concern itself with a systematic, detailed study of the geology of Mexican territory, developing the knowledge from both the scientific and industrial points of view. On being officially established, it was further to be charged with making and publishing a geological map of the Republic, with supplementary monographs. It was also to prepare geologic maps and reports of mining districts. A Geological Museum was to be established by the Institute.

Organizational approval and details took considerable time. In March 1888, the Minister of Production received authority from the President for a Geological Commission to function while the Institute was being organized. The staff of the Commission immediately undertook the preparation of a generalized geologic map and maps of the mineral resources. Both were reconnaissance projects to provide the basis for later detailed investigations.

The second epoch in the history of the Geological Institute of Mexico began in January 1891, two years after its final authorization by the National Congress. In this period the Institute began its general program, but funds were acutely limited since the economy of the country was depressed due to low silver prices. Despite these difficulties which limited the staffing of the Institute, it began its period of service to the people of the Republic in the fields of geology and mineralogy.

In 1906, the Mexican Government acted as host to the geologists of the world for the Xth International Geological Congress. The government gave financial and moral aid to the Geological Institute on this occasion. It also provided funds for an Institute building. Fifty years prior to the opening of the present XXth I.G.C. almost to the day, the Xth Congress convened on September 6, 1906 in the old Palace of Mining.

Another significant mile post in this second epoch was the inauguration of the National Seismological Network under the Geological Institute, with a series of substations throughout the country. The work of the Institute was halted temporarily in 1915 during a period of national political unrest. Between 1918 and 1929 there were a number of changes in organization. Most important was its elevation in status to the Department of Exploration and Geological Studies under the Secretary of Industry and Commerce. With this new recognition came important increases in funds which permitted more extensive geological investigations.

The third epoch opened in 1929 when the Geological Institute of Mexico, which had operated since 1918 under the Secretary of Industry and Commerce, was, by legislative action, made a part of the University of Mexico. Its program and functions, however, remained essentially the same. In this epoch, which embraces 1930 to the present, the Institute has made significant progress. It now has three buildings: the old one at Santa Maria Ribera houses collections of Mexican fossils, rocks and minerals, and there are two new buildings at University City where the administrative and staff offices as well as laboratories are located.

The voluminous publications of the Geological Institute of Mexico attest its success, and the vitality of its cooperative efforts in the staging of the XXth Congress indicates in good measure what may be expected of it in future years.

HISTORY of GEOLOGIC STUDIES in MEXICO

by the late Teodoro Flores

When El Real Seminario de Mineria, today known as the National School of Engineering, was founded at the end of the 18th century, it served to stimulate greatly the advancement of knowledge of the geology and mineralogy of Mexico. However, in 1872 when Aguilera made a study of the status of development of geology in Mexico, he noted that until that time the major contributions to geologic knowledge had been made principally by foreign investigators working for private interests, national commissions and state governments. In the course of his studies Aguilera stimulated the formation of the Mexican Geological Society and became its president. As a result, investigations in the late 1800's became more systematic and scientific in nature and the Geological Institute was subsequently founded in 1888. The Geological Institute was devoted to both basic and applied geology, and one of its major early contributions came in 1906 with the publication of geological guidebooks in 31 parts in connection with the Xth IGC excursions.

During the social crises in the period 1911-16 political events retarded development of the knowledge of the geology of Mexico, but investigations and publication of data were not interrupted. However, when the Institute was reorganized in 1917 its function was in part reoriented. Utilizing the basic data of previous years, more practical, applied research was undertaken. Investigations of mineral resources and hydrologic studies for the benefit of populated areas received much attention, in the period 1917 to 1928, when the Institute became affiliated with the University. The study of hydrology continued to be important because of water requirements of the Republic, but the stratigraphy and paleogeography of Mesozoic rocks were also studied intensively.

In the past decade two most important events dominated the geologic picture of Mexico: (1) the discovery of Middle and Lower Cambrian rocks at Caborca, Sonora and (2) the birth of the new volcano, Paricutin, in Michoacan on February 20, 1943.

Early 1944 studies in economic geology were instituted by the newly formed Committee for the Investigation of Mineral Resources, later to become in 1949 the Institute of Mineral Resources. This organization has published reports on the following metallic and non-metallic minerals: antimony, sulphur, bismuth, optical calcite, carbon, iron, phosphate, magnetite, manganese, mercury, gold, silver, lead, tungsten, uranium and zinc.

Oil was first discovered in Mexico on March 4, 1904 when an exploratory well in the Ebano region came in as a gusher producing 1500 bbls. per day. Mexico has had commercial oil production continuously since that day. Much data on the geology of Mexico has resulted from exploration for petroleum. The very active Exploration Department of Petroleos Mexicanos has discovered new, favorable oil structures and has conducted extensive studies of sedimentation and stratigraphy of potentially oil-bearing formations.

The Secretary of Hydrologic Resources, charged with urgency of providing water in many areas of Mexico including the deserts, organized a geological department for the study of ground water problems relating to irrigation and municipal water supplies. The department has employed geologic and geophysical techniques and has made significant contributions to the knowledge of the geology of Mexico.

The Institute of Geophysics, beginning in 1949, is a newcomer to the geological picture in Mexico but has made important advances. Difficult to appraise are the important additions to the knowledge of the geology of Mexico made by individual geologists and by those employed by private enterprise, particularly the mining industry.

The excursion guidebooks and monographs on the geology of Mexico which have been prepared for the XXth International Geological Congress collate the accumulated data of these many sources to give the most comprehensive story of the geology of the Republic of Mexico.

MANPOWER *in a column —*

By HOWARD A. MEYERHOFF
Scientific Manpower Commission

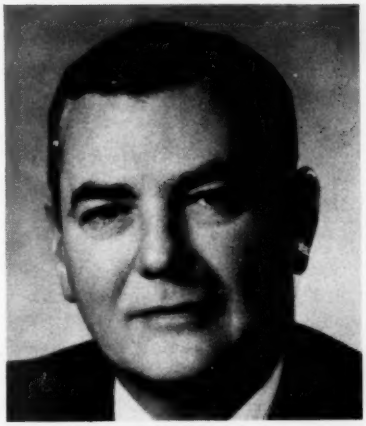
Not long ago one of Peru's best North American bush pilots flew two oil geologists over the high Andes from Lima and landed them at Iquitos in the upper Amazon Basin to begin a program of exploration along the Maranon and Pucayallpa. Their coming was unannounced, yet that evening it was celebrated by eight compatriots who were in Iquitos on similar missions for other oil companies. The event was symbolic, not unique. Like Kilroy, geologists go everywhere.

No one has attempted a count of the North American geologists and geophysicists who are working outside the territorial boundaries of the United States, but the number must be close to 6,000, or twice as many as all the scientists and engineers currently employed overseas by the International Cooperation Administration in the Point 4 program. The last count available reveals that there were 2,134 technologists in U. S. government service and 765 in contractual services directing or participating in the projects sponsored by ICA. Perhaps there are 3,000 more engaged in engineering and industrial projects financed by North American capital, but the fact remains that the earth scientists comprise about half the total of our technological ambassadors to other countries.

Current Russian efforts to build up their pool of scientific and engineering personnel have been widely publicized. Only recently, however, has it been realized that the USSR is producing a surplus of technologists for export. Burma has been given a technological institute by the Soviets that will be staffed by Soviet scientists and engineers. A similar offer has been made to India. It is in essence a Soviet "Point 4" program carrying Soviet idealogy as well as technology to parts of the Far East and South Asia.

Despite the shortage of scientists and engineers, the Western world is stimulating a steady flow of highly skilled personnel to other countries where technological service is sorely needed. The Western scientist abroad must consider himself not merely an expert, there to accomplish a specific task, but also an emissary of Western culture and democracy. Of all the technologists, the geologists and the geophysicists must assume the greatest responsibility, for it is they who are the most numerous and who cover the most ground.

DIPLOMAT HOOVER HONORED

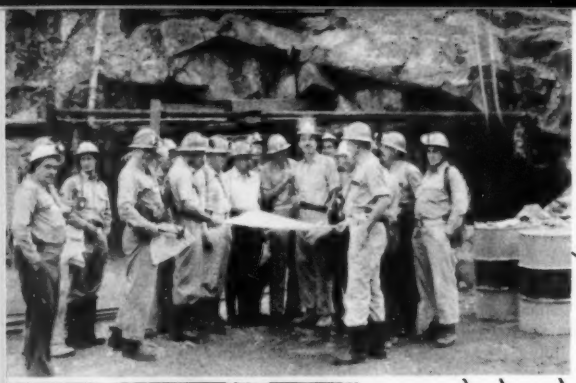


Herbert Hoover, Jr., Under Secretary of State, has been awarded the Hoover Medal of the Four Founder Engineering Societies. The award was established in honor of his father, former President Hoover, who was the first recipient of the medal in 1930. The Hoover Medal is awarded by the engineering societies in recognition of those principles of civic obligation and public service exemplified by the life and work of Herbert Hoover. A practising geophysicist and President of the United Geophysical Corporation before entering public service, he is a member of AAPG, SEGp and AIME.

NEW CAREER PAMPHLET

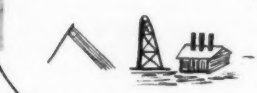
AGI is now distributing a new career booklet, *"Should You Go into the Mineral Industry?"* in its kit of career literature, which includes the AGI's own *"Shall I Study Geological Science?"*

The new booklet was written by geologist John W. Vanderwilt, President, Colorado School of Mines and was used originally in a career series advertisement in leading national magazines by the New York Life Insurance Co. The booklets have been provided free of charge to the AGI by the company.



Excursion A-I visits Cananea Consolidated Copper Co. S. A. on August 15-16, 1956 to open XXth Congress activities.

Cananea



Paricutin

The name of the late Dr. William F. Foshag is almost synonomous with Paricutin. Bill Foshag loved Mexico and is missed by his many Mexican friends.

Chichen Itza

la Ciudad Universitaria

School of Medicine

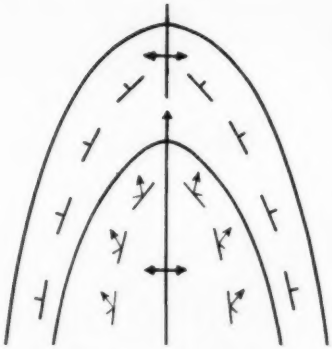
Aerial view of University City

Aztec Calendar

San Juan Teotihuacan

pre-Spanish Mexico

Chichen Itza



GEOLOGIC MAP OF MEXICO AND ITS DEVELOPMENT

by Santiago H. S. Mejorada

In 1889, year of the Paris Exposition, Antonio del Castillo was named Director of the Geological Commission of Mexico and undertook to prepare for the exposition a reconnaissance geologic map of the Republic and more detailed maps of the most important mining districts. The map was compiled from data obtained from a series of geological traverses, some into regions previously unknown. In addition geological reconnaissance in the states of Puebla, Veracruz, Tlaxcala, Oaxaca and Sonora was carried out by Jose G. Aguilera of the Commission of Geographic Exploration. The map was published on the scale 1:3,000,000 and it differentiated rocks by geologic age in colors conforming with the plan proposed at the International Geological Congress, Bologna, 1882. Contributing to the map were the following workers: Augustin Barroso, J. C. Spear, J. G. Aguilera, Federico Weidner, and Antonio del Castillo. In 1897, under the direction of the Secretary of Development, a new map was prepared by A. del Castillo on the scale of 1:10,000.

When the Xth International Geological Congress met in Mexico in 1906, J. G. Aguilera, then Director of the Geological Institute of Mexico, cooperated with geologists in Canada and the U. S. in the preparation of the geological map of North America presented at that Congress. He also published a series of 1:5,000,000 maps including a general geologic map of Mexico, modified by new data on Yucatan, Tabasco and Chiapas by C. Sapper and E. Bose. The next marked advance was in the geologic map of the Republic of Mexico published in 1937 under Manuel Santillan, Director of the Geological Institute of Mexico.

In 1942 the National Commission of Irrigation published a map incorporating new detailed geologic data on the extreme northern and northeastern part of the country and improved, modified information on the south of the Republic. The Geological Institute of Mexico in 1947 published, in collaboration with the U. S. Geological Survey, a map of the northern part of Mexico on the scale of 1:2,000,000. This map, edited by Philip B. King, utilized data of private industry, scientific institutions and government surveys. It included a table of source data and a geologic column.

In Algiers, in 1952 at the XIXth International Geological Congress, the Mexican Delegation consisting of Eduardo J. Guzman, Rodolfo Suarez and Ernesto Lopez Ramos, presented a geologic map on the scale 1:2,000,000 of the Coastal Plain and the states of Chihuahua and Coahuila. This map presented new detail on the outcropping formations.

In 1954 the Geological Institute of Mexico and the Geological Department of Petroleos Mexicanos prepared a geological map of a scale of 1:2,000,000 which was presented in Buenos Aires, Argentina to form a part of the Geological Map of America under the auspices of the Geological Society of America. In preparation of this map, the eastern part was based on the map of 1952 presented at Algiers, and for the central and western part, the map of Philip B. King (1947). For Baja California, data prepared by Carl Beal for the north part and for the extreme south and by Federico Mina Uhink from parallel 28° down to 23°30′ was employed. The northern part of the state of Chiapas was based on data supplied by Petroleos Mexicanos.

1956 Geologic Map

The Executive Committee of the XXth Session of the International Geological Congress, Mexico, 1956 will present the

Geological Map of the Republic on a scale of 1:2,000,000, prepared by the author of this article in collaboration with the technical personnel of the geological department of the Chief of Exploration of Petroleos Mexicanos and of geologists of the Instituto de Geologia of the Universidad Nacional Autonoma, the Instituto Nacional para la Investigacion de los Recursos Minerales, the United States Geological Survey, the Instituto Nacional de la Investigacion Cientifica and from private sources.

In this edition, prepared very carefully, there is a marked change as compared with earlier editions, because some of the data has been supplied by very recent work.

Some of the important new data included in this map is based on work done south of parallel 28° in Baja California; the Paleozoic areas in the central and northwestern parts of Chihuahua; newly found Paleozoic areas in the vicinity of Delicias, Coahuila; Jurassic localities in the northeastern part of the Republic and the states of Tamaulipas, Nueva Leon and Coahuila; on detailed and semidetailed studies which changed the Paleozoic section and the understanding of the tectonics of Oaxaca, Guerrero, Jalisco and of Michoacan, as well as detailed work undertaken in the petroleum fields of the Gulf Coast which includes the states of Neuvo Leon, Tamaulipas, San Luis Potosi, Puebla and Veracruz.

This map will show for the first time the geological picture of the Isthmian region of Chiapas and the base of Yucatan, based on geological work done in drilling for oil and sulfur. New data will be shown that has been developed by studies in the central and northwestern parts of the Republic.

This new geologic map has been compiled on the recently completed geographic base map edited by the Secretary of Agriculture and Animal Husbandry, the Coordinating Committee for the Geographic Map of Mexico, the Military Cartography Commission of the Secretary of National Defense, with information from Petroleos Mexicanos, the American Air Force and other sources.

It must be noted that there are still large zones in the Republic where the geological work that has been done has been very general, and it is to be hoped that in the near future new data will become available that will permit us to identify all of the geological features of the country.

Archeology *continued from page 12*

were numerous and of b ·lliant colors.

The architectural remains of the Militaristic period are: La Quemada, Zacatecas, constructed on a hill similar to Monte Alban, and Xochicalco which was a city of the fortress type. The columns which formed porticoes were made of slabs of stone, and the walls have the indisputable stamp of the late Toltec period. Tenayuca is pre-Aztec; its square pyramid had a coatepantli (belt of serpents) around three sides. Malinalco, a monolithic city built into the natural rock, appears to be Aztec. Cempoala was the center of Totonac culture at a decadent stage. Isla de Sacrificios, Veracruz, is noted for alabaster vessels. Tepoztlan, Morelia, with its temple to Ometochtli, god of pulque, was contemporaneous with the Aztec epoch. Teopanzolco has a type of construction characteristic of this epoch and has two temples in the upper part similar to the pyramids of Tenayuca, Tlatelolco and Tenochtitlan. Castillo de Teayo, Veracruz, was a city constructed during the first Aztec colonization of this area. Tulum, in Quintana Roo on the Caribbean, was a large city built with Mexican influence. Tzintzuntzan, Mich., which was the capital of the Tarascos, has archeological ruins called the yacata which are pyramids of varied form made of stones and uncut flags. Most were found in the form of a T and were covered with slabs of volcanic rock. The Tarascan ceramics are as unmistakable as their work in metallurgy. In the streets of Guatemala are ruins of the major temple of Tenochtitlan, very similar to that of Tenayuca. Of the enormous sculptural production of the Aztecs one must mention the sunstone or Aztec calendar which was carved from a porphyritic rock and weighs 20 tons; the stone of Tizoc on which was carved in hieroglyphics the story of the conquests of this Aztec king and of the places conquered; and the Coatlicue, an enormous sculpture, which represents the earth goddess, mother of the gods.

Dr. G. Arthur Cooper has been appointed Head Curator of the Department of Geology of the U. S. National Museum, succeeding the late Dr. William F. Foshag. Dr. Cooper will continue to serve as Curator of invertebrate paleontology and paleobotany. Dr. George S. Switzer has been designated as Acting Curator of the Division of Mineralogy and Petrology.

OUTSTANDING McGRAW-HILL BOOKS

MICROSCOPIC PETROGRAPHY

By E. Wm. Heinrich, University of Michigan. McGraw-Hill Series in the Geological Sciences. 292 pages, $6.50

A complete treatment of the microscopic investigation of igneous, sedimentary, and metamorphic rocks. All major types of rocks in each group are described chiefly from the microscopic viewpoint with emphasis on the employment of thin sections of their study. Considerable material is provided on the interpretation of the genesis of the rocks based upon their mineralogies and textures.

PHYSICS AND CHEMISTRY OF THE EARTH

Progress in Physics and Chemistry of the Earth—Volume I

Edited by L. H. Ahrens, Oxford University; Kalervo Rankama, University of Helsinki; and S. H. Runcorn, King's College. 326 pages, $8.00

Provides authoritative and up-to-date surveys of progress, results, and methods for those actively engaged in geophysics and geochemistry. Volume I consists of chapters on important specific topics written by internationally known scientists. It contains a review of progress on the geochemistry of the halogen group of elements and a review of some aspects of Russian geochemistry and geophysics during the last five years.

ELASTIC WAVES IN LAYERED MEDIA

With Geological, Acoustical and Engineering Applications

By W. Maurice Ewing, Columbia University; Frank Press, California Institute of Technology; and W. S. Jardetzky, Columbia University. McGraw-Hill Series in Geological Sciences. In press

An outstanding new work of vital importance in geophysical prospecting, seismology, many acoustical problems, oceanography, etc. It presents a uniform presentation of the investigations (by the Lamont Geological Laboratory group) on earthquake seismology, underwater sound, model seismology and related problems. It covers fully the experimental and the theoretical aspects of the subject, spanning the whole world literature, in order to give new investigators the first review of the field.

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JURASSIC GEOLOGY OF THE WORLD, by W. J. Arkell, 806 pp., 28 correlation tables, 102 figs., 16 pls., Hafner Publishing Co., 31 E. 10th St., New York, 1956, $16.50.

Professor Arkell of Cambridge University, was only recently elected a Correspondent of the Geological Society of America in recognition of his work on the Jurassic of the world. In this volume he has made the first comprehensive synthesis of a complete geologic system based on marine faunas in all parts of the world. The volume is divided into three principal sections: I. Introduction, discussing the bases for classification and correlation; II. Geographic descriptions, covering the areas of Jurassic sedimentation throughout the world; and III. General Survey and conclusions, in which the author summarizes his views on the Jurassic oceans, marine realms and climates, mobile belts and geosynclines, volcanism and diastrophism. More than 100 pages are required for the comprehensive bibliography, which will be invaluable to students of Jurassic geology. The systematic review of Jurassic ammonites, upon which the author bases many of his correlations, is to appear in the Treatise of Paleontology, R. C. Moore, editor. This work by Professor Arkell is a milestone in geologic literature.

MICROSCOPIC PETROGRAPHY, by E. Wm. Heinrich, 296 pp., 70 figs., McGraw-Hill Book Co., Inc., 330 West 42nd St., New York, 1956, $6.50.

It is the purpose of this book to bring together data on the petrographic description of igneous, metamorphic and sedimentary rocks and is intended as a reference book for students and for the practising geologist. The petrographic characteristics of all major rock groups are discussed and many typical microscopic features are illustrated.

PROSPECTING FOR GROUND WATER BY INDUCED ELECTRICAL POLARIZATION, by Victor Vacquier, New Mexico Inst. of Mining and Technology, Socorro, N. M., 41 pp., 1956.

An interesting and informative illustrated summary of Vacquier's talk given throughout the country as SEGp's "Distinguished Lecturer of 1956."

WILEY BOOKS

WILEY PUBLICATIONS IN THE EARTH SCIENCES

To meet the needs of scientists, teachers, and students, John Wiley & Sons offers a list of more than 50 distinguished titles in geology, mineralogy and other allied branches of the earth sciences. A selection of nine recently published books is given below. Choose the ones you would like to read, then write for examination copies.

PETROGRAPHIC MODAL ANALYSIS, An Elementary Statistical Appraisal

By Felix Chayes, Carnegie Institution of Washington. *1956. Approx. 136 pages. $5.50.*

ATLAS OF PALEOGEOGRAPHIC MAPS OF NORTH AMERICA

By the late Charles Schuchert, formerly of Yale University. *1955. 177 pages. $4.75.*

ELEMENTARY CRYSTALLOGRAPHY

By M. J. Buerger, The Massachusetts Institute of Technology. *1956. 528 pages. $8.75.*

GEOLOGY IN ENGINEERING

By John R. Schultz, Waterways Experiment Station, Vicksburg, Mississippi; and Arthur B. Cleaves, Washington Univ. *1955. 592 pages. $8.75.*

NUCLEAR GEOLOGY

Edited by Henry Faul, U.S. Geological Survey, Denver. *1954. 414 pages. $7.00.*

EVOLUTION OF THE VERTEBRATES, A History of the Backboned Animals through Time

By Edwin H. Colbert, American Museum of Natural History. *1955. 479 pages. $8.95.*

INTRODUCTION TO PHYSICAL GEOLOGY

By Chester R. Longwell and Richard Foster Flint, both of Yale University. *1955. 432 pages. $4.95.*

REALMS OF WATER

By P. H. Kuenen, University of Groningen, The Netherlands. *1955. 327 pages. $6.50.*

PETROGRAPHIC MINERALOGY

By Ernest E. Wahlstrom, University of Colorado. *1955. 408 pages. $7.75.*

JOHN WILEY & SONS, Inc., 440 4th Ave., New York 16, N. Y.

PHYSICS AND CHEMISTRY OF THE EARTH, by L. H. Ahrens, Kalervo Rankama and S. H. Runcorn, 317 pp., McGraw-Hill Book Co., Inc., 330 E. 42nd St., New York 36, N. Y., 1956, $8.00.

This book is volume one in a new series on "Progress in physics and chemistry of the earth." It brings together under one cover information on various pertinent topics from the fields of chemistry, physics, geology, geochemistry and geophysics. It should serve as an informative reference book to the geologist and an inter-disciplinary source book that should stimulate further research into these areas. It is the intent of this series to review periodically the development of knowledge on various subjects at intervals depending on progress and importance.

This first volume contains a review of the status of data and thinking on the origin of the solar system by Sir Harold Spencer Jones, and J. Verhoogan reviews temperatures within the earth. Other topics discussed are radioactive age determinations, seismology and the interior of the earth, research into hydrothermal conditions and a review of Geochemistry in Russia. The chapters are well documented with references.

AN INTERNATIONAL ABSTRACTING SERVICE FOR GEOLOGY, by P. Fitzgerald Moore, Jour. Alberta Soc. Petrol. Geol., Aug. 1955.

SUMMARIO IN INTERLINGUA

Barrieras linguistic, spatial e cultural, impedi la excambio de information inter geologos de varie nationalitates. Le disveloppamento de gelogia, e le recerca, es retardate, e un repetition ineconomic de labor occurre. Un solution partial essereo le creation de un servicio international pro summarios geologic.

Le publication esserea sur cartas, con un indice de subjectos secundo le systema de Classification Decimal Universal, con summarios e in le lingua de origine e in un lingua supranational tal como Interlingua. Cata pais prepararea cartas original pro su proprie publications e excambiarea los con altere paises.

La schema deberea esser operate sur iste continente per A.G.I. (American Geological Institute) e poterea esser initiate, sur un base mundial, al proxime Congresso International Geologic.

ABSTRACT IN ENGLISH

Linguistic spatial and cultural barriers hinder the exchange of information between geologists of various countries. The development of geology and of research is retarded and an uneconomic repetition of work takes place. A partial solution would be the creation of an international abstracting service for geology.

Publication would be in card form, with a subject index based on the Universal Decimal Classification, with abstracts both in the language of origin and in a supranational language such as Interlingua. Each country would prepare master cards for its own publications and would trade them with other countries.

The scheme should be operated on this continent by A.G.I. (American Geological Institute) and could be initiated, on a world-wide basis, at the next International Geological Congress.

Announcing . . .

CLAYS AND CLAY MINERALS

Annual Conference Proceedings

An important contribution to the literature on clays and clay mineralogy and essential to the investigator's library, these publications include data on geology, mineralogy, soil chemistry, soil physics, soil mechanics, physics, colloid chemistry, and ceramics.

SECOND CONFERENCE. 1955; 498 p., cloth; $4.00. Pub. 327
Features atomic structure of clay minerals with attention to chlorite and mixed-layer clay minerals; new developments in techniques for identification in complex minerals, including a report on differential thermal analyses under controlled atmospheric conditions.

THIRD CONFERENCE. 1956; 566 p., cloth; $7.00. Pub. 395
Highlights electron microscopy and X-ray and electron diffraction studies of various clays. Reproduces details of numerous high resolution electron micrographs.

FOURTH CONFERENCE. In press; about 500 p., cloth; $6.00. Pub. 456
Of special interest is the international session in which scientists from abroad summarize recent investigations in their own countries. Notes the use of infra-red absorption spectra for identification and correlation of physical chemistry and X-ray structure.

Also of interest . . . Symposium on Oceanographic Instrumentation. 1954; 233 p., $1.75. Symposium on Microseisms. 1954; 125 p., $1.00. Annual Reports of the Committee on Measurement of Geologic Time. 1934 through 1955. Priced from $0.50 to $1.75. Rural Settlement Patterns in the United States as Illustrated on 100 Topographic Quadrangle Maps. 1956; 60 p., $1.50. Proceedings of the XVIIth Congress of the International Geographical Union. In press.-$15.00.

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Books of Interest . . .

STRATIGRAPHY AND SEDIMENTATION
by Krumbein and Sloss
507 pp., 123 line drawings, 1951, $9.50

STRATIGRAPHIC GEOLOGY
by M. Gignoux, translated by G. Woodford
698 pp., 155 illus., 1955, $9.50

GEOLOGY OF PETROLEUM
by A. I. Levorsen
713 pp., 327 illus., 47 tables, 1954, $8.00

PETROGRAPHY
by Williams, Turner and Gilbert
416 pp., 133 illus., 47 tables, 1954, $8.00

PRINCIPLES OF GEOLOGY
by Gilluly, Waters and Woodford
640 pp., 306 illus., 1951, $6.00

ROCKS AND MINERAL DEPOSITS
by P. Niggli, translated by R. Parker
574 pp., 331 illus., 73 tables, 1954, $12.00

THE PERMIAN REEF COMPLEX
of the Guadalupe Mountains Region, Texas and New Mexico
by N. D. Newell, et al
308 pp., 225 illus., 1953, $7.50

GENERAL CHEMISTRY
by L. Pauling
722 pp., 193 illus. 2nd Ed., 1953, $6.50

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Responsibility *continued from page 7*

operation of men in the universities, government surveys and in national academies has been found useful in the accumulation and interpretation of such data from private sources without detriment to these interests. The salvaging of the fund of knowledge that lies buried in company files is certainly a pressing responsibility.

Americans have been taught to think in terms of sharing technical know-how with countries that may need it. These skills need not be restricted to the search for mineral resources but can also be directed toward the betterment of a way of living as, for example: groundwater and engineering geology techniques.

In 1913, arriving by boat in Naples toward evening, I rushed off to see the sun set behind Vesuvius from the height of Posilipo. The only way to get up in time was by elevator but I had no Italian money. A stranger paid my small fare and then led me through his palatial home to the veranda where the celebrated scene lay spread out before us. As he led me back he said: "I do not know you. What I have done I did as an Italian to you as an American. If in the future you act likewise, you will help to build confidence between our nations." His genteel gesture points up the most general responsibility of all of us—the geologists of the world.

NSF RESEARCH GRANTS

The Earth Sciences Program of the National Science Foundation announces that it is now receiving applications for research grants to be made in the first six months of calendar year 1957. Cutoff dates for proposals will be October 1, 1956 and February 8, 1957. Applications received prior to October 1 will be considered for grants to be awarded in February; those received prior to February 8 will be considered for grants to be awarded in June, 1957. Applicants are cordially invited to submit their proposals well in advance of the cutoff dates in order to avoid last minute log jams, although we sadly realize that this is probably on a par with urging taxpayers to file returns before 11:59 p.m. on April 15.

DEAR EDITOR:

First, my congratulations on GEOTIMES. It is excellent. I believe the Institute is over the hump and because "nothing succeeds like success" I believe that we will now find that the former "luke-warm" supporters will become enthusiastic.

Keep up the good work, and with best personal wishes, I am

Yours sincerely,

PAUL H. PRICE
Director and State Geologist
West Virginia Geological Survey

DEAR EDITOR:

I would like to start a small fracas on the Paleocene. I will not waste my time and your space by quoting chapter and verse. Nevertheless, it appears to me from a cursory examination of American, British and "Continental" stratigraphic usage, that there are *three* schools of thought:

1. There is no need for the term Paleocene.
2. The term Paleocene is necessary, but Paleocene is part of the Eocene.
3. The term Paleocene is not only necessary, but Paleocene is also of epochal rank.

Being neither an eliminator nor an epoch-maker, I rest comfortably on a bed of Paleocene as *part* of the Eocene.

Yours sincerely,

M. KAMEN-KAYE
630 Fifth Ave., Room 3315
New York 20, N. Y.

DEAR EDITOR:

We have been hit by an avalanche of requests (38 in 2 weeks) for copies of Hycon's airborne photography and geophysical film "Portrait of the Earth" since you mentioned it in your "Birthday issue" of "GEOTIMES." This has of course impressed all of us here at Hycon with the wide circulation of "GEOTIMES." It also appears to me that this is a good indication that advertisers should take note of GEOTIMES' popularity.

Best regards,

JOHN C. WHITAKER
Geologist
Hycon Aerial Surveys, Inc.

EDITOR:

Now that we have a Geochemical Society I am hoping I can obtain answers to several questions that have bothered me. For example, can we confidently compare complete rock analyses made in different laboratories? Are small differences in composition significant or merely plus and minus errors? How quantitative are "spec" analyses of "minor" elements?

Is a "quickie" analysis only cheap, or cheap and good, and for what? What is "a typical analysis of the Twobit granite" and what should it be?

Always for more (as well as better) geochemistry,

DR. LIVINGSTONE

Frye Replaces Hake

John C. Frye, Chief, Illinois State Geological Survey, Urbana, has been nominated by AGI President Leighton to replace Ben F. Hake who recently resigned as a Commissioner of the Scientific Manpower Commission and as Chairman of the AGI Government Relations Committee when he was transferred to South America. Dr. Frye was appointed to the Government Relations Committee by the Association of American State Geologists.

Dr. Howard A. Meyerhoff has been appointed the AAPG representative to the Government Relations Committee and will serve as vice chairman.

News Notes

In the Department of Geology, Columbia University, Professor Charles H. Behre, Jr. will be Executive Officer for the next three years, Professor Marshall Kay having completed a similar term.

The Department of Geology at Lehigh University has issued a directory of all known alumni who received degrees in the science. Any Lehigh geologist failing to receive a copy is asked to write Bradford Willard, Chairman.

NEW *Ideas Products Services*

GEO-TIMES will welcome press releases and notices of new ideas, products and services from companies and individuals for possible use in this section.

McArthur Field Microscope. A portable field microscope, about the size of a miniature camera and weighing 20 ounces, affords an image comparable to that obtained with the average lab microscope. It may be carried in the pocket and is of very rugged construction. The microscope has been developed by Dr. John McArthur, London, England.

Applications of Radioactivity. A symposium on application of radio-activity, petroleum research and refinery operations to be held in Boston, Oct. 24-26, 1956. Third in a series of three symposia on applications of radioactivity to industry. To be followed in 1957 with a symposium dealing with exploration. Sponsored by **Tracerlab, Inc., 130 High St., Boston 10, Mass.**

Heliocopter Electromagnetic System for detection of electrically conductive sulfides minerals. This system measures both in-phase and out-of-phase components of the field at a frequency of 4000 cycles. The transmitting and receiving coils are vertical and at right angles. They are rigidly separated in a 20 foot bird which is trailed on a 100 foot cable within 50 feet of the ground. As optional equipment the helicopter carries a scintillometer and a light weight version of the Varian magnetometer. The combination of magnetic, electromagnetic and scintillation counter methods results in detailed information both as regards structure and possible ore zones. The unit has completed a 2000 line mile test program over known ore bodies in the Sudbury, Temagami and Noranda districts of Ontario, Canada. For further information write **Hycon Aerial Surveys, Inc., 1020-30 S. Arroyo Parkway, Pasadena, California.**

ROCK CHIPS

by SANDSTONE SAM

Dear Chairman Thurston:

Please enter the following title for a paper to be presented at the March meeting, "Limitations of radiation prospecting techniques in areas of heavy plastic rock (GeoTimes, July 1955) overburden."

* * *

Geology, having its own peculiarities, is not subject to changing political climates. When man-made difficulties can be settled to mutual satisfaction, geology, like an old friend, will be patiently awaiting our solutions.

* * *

Blessed are they who run around in circles for they shall be known as wheels.

* * *

"Many a fine theory has been punctured by a drill."—FJP April 1956.

* * *

Politics is the art of looking for trouble, finding it everywhere, diagnosing it wrongly, and applying unsuitable remedies. Definition could also apply to a bum geologic argument.

* * *

GEOLOGIST. Wanted capable, affable handsome young geologist to play lead in road production of "Will Success Spoil Rock Hunter." Call, wire or write SsS.

PHOTO CREDITS

The photograph of Under Secretary Hoover was provided by the U. S. Department of State.

On pages 16 and 17 we are indebted to the Embassy of Mexico, the Mexican Tourist Bureau and the Pan American Union for the photographs of University City and pre-Spanish archeological ruins. The pictures of Paricutin are from the files of the late Dr. William F. Foshag and are available to us by the National Museum. Photographs at Cananea were taken on the opening day of Excursion A-1 by M. H. Taylor, Cananea Consolidated Copper Co., S.A. and airmailed to GEOTIMES.

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MARSHALL COLLEGE, Huntington, West Virginia: Teaching position requiring graduate work beyond the master's degree. Experience desired, but is not a requirement. Salary ranging upward to $4,400 with opportunity for summer work. Write: J. F. Bartlett, Dean, Marshall College.

UNIVERSITY OF MICHIGAN has two openings on its museum staff for vertebrate and invertebrate preparators. These are excellent positions for young men who wish to get into museum work of this kind. Applicants should be willing to spend summers in the field. Salaries commensurate with experience. Excellent vacation, sick leave and retirement programs. Write: University of Michigan, Personnel Office, Ann Arbor, Mich.

MICHIGAN STATE UNIVERSITY, East Lansing, Michigan, has an opening beginning September, 1956, for a young man wishing to develop geophysics and hydrology. Salary and rank dependent on qualifications. Write: B. T. sandefur, Dept. of Geology.

BOX 71. Seismologist. Some graduate school training required. Needed to analyze data from seismological stations and conduct research. Salary open.

BOX 72. We need several top grade aggressive geologists under 45 with about 10 years of foreign oil experience. Should have working knowledge of several languages and broad acquaintanceship in several foreign countries. Headquarters Los Angeles with short foreign trips requiring up to 50% of time. Permanent positions for right men with strong independent oil company. Salaries open.

BOX 73. Geologist: M.S. or Ph.D., 5 to 10 years' experience preferably in structural and/or sedimentary fields, to make special regional and detailed geological studies; may involve photogeological, geophysical and geochemical investigations along with field and sub-surface studies, leading to assistance with exploration drilling program; should speak Spanish and be willing to make occasional trips outside U.S. requiring rough field work. Location: Southern U.S. Salary open.

POSITIONS WANTED

BOX 231. Economic Geologist, 36, M.S. degree, wishes to associate with domestic or international consultant, investment or exploration group or represent U.S. mineral interests in Europe. 9 years of domestic and foreign exploration and evaluation experience in metallic and non-metallic minerals. Working knowledge of Spanish, German, French. Aerial photo interpretation and commercial pilot.

BOX 232. Geologist, Ph.D. (B.S. in Paleontology). Primary interests sedimentation, stratigraphy and marine geology. 6 years experience engineering geology, geophysics and and industrial mineralogy. Desires research or teaching position.

BOX 233. Mineralogist-Petrographer desires position in teaching, research and/or administration at salary commensurate with 20 years of progressive experience in educational, governmental and industrial work. Age: 47 years young. Fellow: GSA, MSA. Member: AChemS, SEcG, etc.

BOX 234. Geologist, 41, married, M.A. Geology, 2 years graduate work toward Ph.D., minor Petroleum Engineering, 7 years teaching experience. Prepared to teach Paleontology, Stratigraphy, Petroleum Geology, Structural Geology, Sedimentation, Field Geology, Aerial Photography, History of Geology. 3 years field experience. Publications, references.

BOX 235. Geologist, MS, Canadian exploration and underground experience with some teaching. Desires industrial or teaching position in the Eastern United States.

BOX 237. Geologist, 31, B.Sc., Ph.D., 7 years varied experience in supervisory capacities for government survey and major oil company in North and South America, chiefly in reconnaissance and detailed field mapping, subsurface studies and geophysical work. Principal interests stratigraphy, structural geology, oil exploration, evaluation and development. Desires challenging opportunity with oil company, consultant or teaching with consultant privileges.

BOX 238. Geologist, AB and MS, 30, married, desires position, preferably in S.E. or S.W. states. Five years experience in general and engineering geology in S.E., including surface and subsurface exploration for foundations and materials.

BOX 239. GEOCHEMIST, Ph.D., wishes college or university position offering opportunities for research. Prefers teaching-research combination. Will consider state survey or industrial research.

BOX 240. Ground Water Geologist desires position with private industry or consulting firm. 7 years U.S.G.S. experience in geologic and quantitative aspects of ground water studies.

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Calendar

Cooperation of Society Secretaries in supplying meeting notices for GEOTIMES calendar is requested.

Sept. 4-11, 1956—20th INTERNATIONAL GEOL. CONGRESS, Mexico, Pre-Congress Excursions August 15-Sept. 2; Post-Congress Excursions Sept. 13-21. D.F. Contact: Congreso Geologica Internacional, Calle Balderas 36, Despacho 302A, Mexico, D.F.

Sept. 5-7, 1956—WYOMING GEOL. ASSOC., 11th Ann. Field Conf., Jackson Lake Lodge, Moran, Wyo. Field trips through Jackson Hole area. Write: K. W. Frielinghausen, Box 1571, Casper, Wyo.

Sept. 17-21, 1956—AMER. SOC. FOR TESTING MATERIALS, 2nd Pacific Area National Meeting & Apparatus Exhibit. Hotel Statler, Los Angeles, Calif.

Sept. 20-22, 1956—OKLA. CITY GEOLOGICAL SOC., Field Conference studying Paleozoic rocks of NW Anadarko Basin, Oklahoma Panhandle and Colorado Front Range, Central Colorado. Register with L. S. Beckmann, Champlin Refining Co., Box 1713, Oklahoma City, Okla.

Sept. 26-28, 1956—A.I.M.E., ROCKY MT. MINERALS CONF., Newhouse Hotel, Salt Lake City, Utah.

Sept. 27-30, 1956—7th ALASKAN SCIENCE CONFERENCE, spons, by Alaska Div. A.A.A.S., Juneau, Alaska. Sections on Geol. & Geog. and Geophysics are included. Write airmail: C. H. Baltzo Fish & Wildlife Serv., Juneau, Alaska.

Sept. 30-Oct. 2, 1956—ACSM-ASP Fall convention and co-exhibit, Shirley-Savoy Hotel, Denver, Colo. Write: ACSM-ASP, Box 1407, Edgewater Br., Denver 14, Colo.

Oct. 1-4, 1956—AMER. MINING CONGRESS, Metal Mining & Ind. Mineral Conv. & Exposition. Shrine Exposition Hall, Los Angeles, Calif. Hotel Reservations from A.M.C. Housing Bur., L. A. Chamb. of Comm., 1151 S. Broadway, Los Angeles 15, Calif.

Oct. 2-5, 1956—NATIONAL WATER WELL ASSOCIATION, Ann. meeting and Exposition. New Franklin Co. Veteran's Memorial Auditorium, Columbus, Ohio.

Oct. 8-10, 1956—NATIONAL CLAY MINERALS CONFERENCE, Univ. of Illinois, Urbana, Ill.

Oct. 14-17, 1956—A.I.M.E., Petroleum Br. Biltmore Hotel, Los Angeles, Calif.

Oct. 25-26, 1956—A.I.M.E., Fuels Conference, Coal Div., Sheraton-Park Hotel, Washington, D. C.

Oct. 29-Nov. 1, 1956—SEGp, 26th Ann. mtg., Roosevelt Hotel, New Orleans.

Oct. 31-Nov. 2, 1956—GULF COAST ASSOCIATION OF GEOLOGICAL SOCIETIES, 6th Annual Convention, Plaza Hotel, San Antonio, Texas.

Oct. 31, Nov. 1-2 1956—GSA, MSA, PS, SVP, AGI Ann. Mtg., Minneapolis.

Nov. 8-9, 1956—A.A.P.G., S.E.Gp., & S.E.P.M., Pacific Section, Ambassador Hotel, Los Angeles, Calif.

Nov. 8-10, 1956—A.I.M.E., N.E. REGIONAL MEETING, Mining Branch, Hotel Hershey, Hershey, Pa.

Dec. 28-30, 1956—SVP, ANNUAL MEETING, at Amer. Mus. of Nat. Hist., New York City.

1957-58 — INTERNATIONAL GEOPHYSICAL YR.

Feb. 24-28, 1957—A.I.M.E., Annual Meeting, Hotels Roosevelt and Jung, New Orleans, La.

Mar 10-16, 1957—ENGINEERS JOINT COUNCIL, 2nd Nuclear Engineering and Science Congress, Convention Hall, Philadelphia.

May 16-18, 1957—G.S.A., SOUTHEASTERN SECTION, Morgantown, W. Va.

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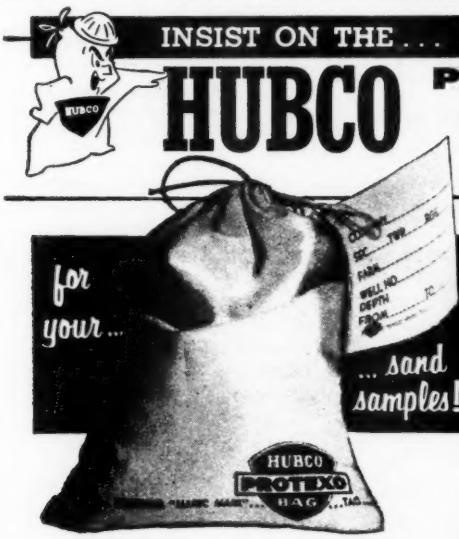

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